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MORAL INFLUENCE

OF

PHYSICAL SCIENCE

BEING THE SUBSTANCE OF A LECTURE DELIVERED AT THE
TOWN HALL, ON JANUARY 7, 1891, UNDER THE
PRESIDENCY OF HIS HONOUR THE
LIEUTENANT-GOVERNOR.

BY

MAHENDRA LAL SIRCAR, M. D., C. I. E.,

FELLOW OF THE UNIVERSITY OF CALCUTTA, EDITOR OF THE CALCUTTA
JOURNAL OF MEDICINE, MEMBER OF THE ASIATIC SOCIETY OF
BENGAL, LIFE-MEMBER OF THE BRITISH ASSOCIATION
FOR THE ADVANCEMENT OF SCIENCE, MEMBER
OF THE LEGISLATIVE COUNCIL OF
BENGAL, ETC.

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PREFACE.

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The following lecture, which was delivered upwards of a year ago, is now published at the request of a few friends, whose opinions I respect. I must say, however, that I have derived no less encouragement from the kind words which His Honour the President spoke on the conclusion of the lecture.

Having been hastily prepared, at a time when I was busily engaged with the harassing duties of my profession and in a state of health which scarcely permitted of any concentration of mind necessary to dealing with a most difficult but important subject, I did not even dream that the lecture should be so favourably received.

In sending it to the press I have not had to make any alteration in any of the arguments used. I have simply amplified one or two here and there. I have, however, supplied an omission which, having regard to the shortness of the hour, was inevitable in the lecture as originally delivered. This is the reference to a future life. I trust I have been able to show that the very fact of the possibility of physical science with its ever-widening sphere, is one of the strongest arguments that lead to a belief in a life beyond the present.

I shall deem myself amply rewarded if this little pamphlet will convince our young men that physical science, beyond bringing us material comforts, has a most elevating and spiritualizing influence, and, therefore, cannot be too earnestly cultivated as an indispensable and most potent factor of human progress.

M. L. S.

CALCUTTA, *February*, 1892.

THE INFLUENCE OF THE STUDY OF THE PHYSICAL SCIENCES ON MORAL CONDUCT.

YOUR HONOUR AND GENTLEMEN,—

I was asked by the projector of this series of lectures, my esteemed friend Babu Pratap Chunder Mazumdar, to take a part in the course, and it was suggested that the subject of my lecture might be "Natural Laws as guides to Moral Conduct."

While I consented, not without a deep sense of incompetency, to endeavour to contribute my humble share to the series, I reserved to myself the liberty of framing the title of my lecture. For, I perceived at once that the suggested title was too comprehensive for a single lecture, and besides it appeared to me to be one of such a nature as might land us in a hopeless intricacy of endless discussion. Natural Law includes physical as well psychical law, and consequently, the subject would embrace the whole domain of knowledge attainable by the exercise of our intelligence. Natural Law, again, might suggest by contrast *super-natural*, and then the lecturer might be tempted to obtrude his opinions on the reality or the unreality of the super-natural, which may not be pleasant, certainly would not be profitable.

As the object intended to be served by these lectures is to help the moral development of our young men, not at the expense of, but alongside of, their intellectual development, and as the purpose my friend had in view in selecting my humble self as one of the lecturers, was probably that I should say something about the educational value of the physical sciences from a moral point of view, I have taken as the subject of my discourse, "the Influence of the Study of the Physical Sciences on Moral Conduct."

It may be questioned, in the very beginning, if the physical sciences can have any possible influence on the moral conduct of persons who are engaged in their study. The branches of knowledge which go by the name of the physical sciences, are generally supposed to be concerned with purely physical, as contra-distinguished from psychical or mental, phenomena; and hence it is thought to be inconceivable that they can have any bearing at all on the latter. And, unless they have any such bearing, it is inconceivable that they can have any influence whatever on moral character.

Without entering into the question of the ultimate nature of matter which constitutes the physical world, and of the nature of mind which constitutes the spiritual world, it requires no profound philosophy to tell that matter and mind are bound up together, so far at least as our present existence is concerned, in indissoluble ties. It is Mind which studies the phenomena of matter and their laws, and the operations of the mind can only be carried on through the agency of a material organization.

A study of the physical world, therefore, must necessarily exert a profound influence upon the mind which pursues that study. Volumes might be written, volumes have been written, on this vast and alluring subject. It is impossible, in the course of a brief hour, to give even a bare outline of it. It will be my humble endeavour to place before you a few points which cannot fail to strike even the most superficial observer.

It is hardly necessary to premise, *in limine*, that when we speak of the influence of the physical sciences on moral conduct, we presuppose the existence of a moral nature. If there were in existence beings possessed of the intellect alone, and devoid altogether of the emotions, such beings could never possess a moral nature, and could not therefore possibly have a moral character. To such beings a knowledge of moral laws would be an impossibility, and *à fortiori* no amount of contemplation of the physical world could create or develope in them a moral nature. For nothing could have any influence on that which is non-existent. The development and elevation of a moral nature already existing is possible, and does take place, as we shall show, under favourable circumstances.

The physical sciences embrace a vast, or rather an illimitable field. This is no other than the whole material universe. But infinite as the field may be, the study of it is capable of simplification, and has been simplified. And this simplicity, as we shall see, is of deep significance. The study of the objects under his immediate control in the tiny world he inhabits has enabled man to extend his study of the worlds that people the immensity of space, and he finds to his utter amazement that all these worlds own a most intimate kinship with each other.

The laws of motion which govern masses of matter on earth, are those which govern the larger masses of matter which constitute planets and suns and systems, which are performing their allotted revolutions in the heavens. Thus Mechanics has proved itself to be a science of the widest generality, embracing all matter within its scope and all visible movements among particles of matter, large and small.

Man could not prosecute his studies of matter long before coming to the conviction that there were other kinds of action of matter upon matter than at sensible distances, that there were actions at insensible distances when the particles come in what is ordinarily understood as contact, and that these actions are peculiar and seem to be essentially different from actions at sensible distances, inasmuch as the actions at insensible distances seem to change the nature of the matters that thus come in contact. Here we have the origin of the science which deals with these invisible actions resulting in marked visible changes. Chemistry is the name that has been given to it, and it deals with what have been called chemical affinities by virtue of which different kinds of matter enter into more or less energetic union with each other, so as to form peculiar compounds. The study of these affinities is necessarily intricate and complicated in proportion to the number of these affinities.

The next division of physical science has its origin in the study of living beings. In addition to phenomena which are of a mechanical and of a chemical nature, living beings present phenomena which are unique and peculiar to themselves, unlike any that may come under the domain of mechanics and chemistry. The complexity of their study is far greater than that of chemical affinities, and the complexity and with it the difficulties increase at every step up the scale of organization and life. Biology is the name given to this division of physical science. In biology beyond a certain stage we have the contact of matter and mind, indeed, the close dependence of the one upon the other. In biology, therefore, the simultaneous study of matter and mind is forced upon the inquirer.

Thus illimitable as is the universe, the study of it is resolvable into the three principal divisions just mentioned.* Each division, however, has to be subdivided for profitable study, and with each advance of knowledge the branches of physical science have become multiplied, and the number has become so great as to be beyond the grasp of a single mind. Hence it is that we find that it is only subordinate branches of physical science that are singly made the subjects of special study by scientists. This is an advantage so far as the advancement of the special branch is concerned, but a disadvantage so far as the specialist is concerned, inasmuch as his mental horizon becomes necessarily reduced to a very narrow circle, and, unless widened by general culture, he will naturally attach undue importance to his own conclusions, and endeavour to apply them to the explanation of phenomena outside of his own field of observation, in other words, he will become subject to fancies and prejudices begotten of limited study, which Bacon has figuratively though very significantly called "idols of the den."

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* It may be objected to this sort of division or classification of the physical sciences that it excludes the study of heat, of light, of electricity of magnetism. Now each of these, heat, light, electricity, magnetism, has been proved to be a mode of molecular motion, convertible into each other, and capable of being produced by, and of influencing, chemical affinity. The study of them, therefore, does legitimately come under the second division mentioned above, which may have the more appropriate and comprehensive designation of molecular physics.

In the present day when the interdependence of the various branches of science is being more and more felt and observed, and when, consequently, in order to successfully cultivate any one branch, a general acquaintance with other branches, at least with those which are immediately cognate, has become an imperative necessity, the idols of the den have become much less numerous and their influence less injurious than formerly. But owing to the finite nature of the mind they cannot disappear altogether, and their presence and their perverting tendencies may be observed even in the case of the greatest students of nature.

By virtue of the moral nature with which we are endowed we have certain duties imposed upon us, and these are resolvable into duties to ourselves, duties to our neighbours, and duties to our Maker.

The primary duty that concerns ourselves is the duty of self-preservation. A cognate duty is that of preservation of the race. Both these are regulated by the strongest instincts which we possess in common with the lower animals.

Our duties to our neighbours are also based upon certain instincts and higher emotions and sentiments, and are of a very varied character involving all our varied relations, domestic, social, civic, national, international, and with these I should include our relations with the inferior animals.

Our duty to the Author of our being is of the most solemn and sacred character, and is based upon the highest attributes of mind with which we are endowed.

The ways by which we perform these duties constitute our moral conduct. These ways are dictated by the instincts, emotions and sentiments, in other words, by the faculties of the mind, of which two exercise an authoritative influence over the rest, by regulating and controlling their actions, and may therefore very properly be called the supreme faculties, Reason and Conscience. One of these, Reason, discloses the true relationships of things and events, the other, Conscience, indicates the propriety and impropriety, the right and wrong, of our actions.

The influence of the physical sciences upon our conduct as regard self-preservation ought to be paramount, inasmuch as it is by them that the conditions of healthy existence are determined; and therefore upon them we are dependent for rules for our guidance in the due fulfilment of those conditions. All our higher duties are capable of fulfilment upon the sole condition of healthy existence.

धर्म्मार्थ काममोक्षाणामारोग्यम् मूलमुत्तमम् ।

Dharmártha kámamokshánám
árogyam mulamuttamam.

Health is the chief foundation of virtue, wealth, desire, and beatitude (final liberation of the soul).

These words are as true now as when they were first uttered by our Rishis of old. And therefore it is that the duty of self-preservation is a primary, fundamental duty, the neglect of which means, inasmuch as it involves and necessitates, the neglect of all other duties. But paramount as that influence ought to be, it is yet far from being so. The conditions of our existence are regulated even amongst the best educated by ignorance and caprice rather than by the teachings of physiology, for the simple reason that a knowledge of the science is confined to the student of medicine, and has not yet formed a subject of general education.

A similar remark with greater emphasis has to be made as regards the influence of the physical sciences upon our conduct relating to the duty of preservation of our race. That influence is yet almost non-existent, at least is most deplorably inadaquate to the importance of that duty. The continuance of the species throughout the world of life depends upon the union of two principles which in our human language we call marriage. The observer of nature cannot fail to see that there is a season for each species, of plant and of animal, before which this union, this consummation of marriage, does not take place. In man alone, whom the Author of his being has endowed with the highest attribute of mind—Free Will,—in man the performance of this the highest function of life has been left to his free will. And the creative purpose is obvious,—it is to make the performance of the function not only his highest happiness but his most sacred duty, and thus to make it "the scale by which to Heavenly Love he may ascend." But in nothing that he does has man more culpably abused his free will than in this. As a rule he drowns duty in mere carnal pleasure, and thus converts into the greatest misery and the most prolific source of his degradation that which was to have been his most exquisite enjoyment on earth and one of the most potent means of his elevation.

The best corrective of this moral perversity can only be furnished by an intimate knowledge of that division of the physical sciences which treats of the laws of life, that is, of biology, especially that department of it which treats of animal life. It is only when we are deeply impressed with the laws of reproduction, of the influences of heredity, that we can see through the folly and wickedness of the infringement of those laws, of the disregard of those influences; and then and then only can we exercise an effectual check upon those instincts and passions which otherwise become so ungovernable.

The burning topic of the day in my country, which is convulsing Hindu Society and has roused, I am glad to say, earnest patriotism, is the perniciousness of the custom of child-marriage, a custom which has been the most efficient cause of the ruin and degeneracy of the Hindu race. I believe it would be impossible for this custom to endure, if the leaders of our society, or better still, if every man and woman of our community, were made to see in the light of physiology what child-marriage in reality means, if they could be made to fully realise that it not only inevitably and to a living certainty prematurely exhausts the couples who are forced to reproduce before the proper season, before they themselves arrive at maturity, but by virtue of that gives rise to offspring who must necessarily share all the immaturity and attendant weakness and incapacity of the parents, and that a succession of such generation means progressive degeneracy and imbecility of the race thus perpetuated.

The influence of the physical sciences upon our conduct as regards our duties to our neighbours is not of the direct character that we have found it to be upon our conduct as regards our duty to ourselves and to the race. But though indirect, they are not less important. "Do unto others what ye would they should do unto you," is the righteous rule formulated by sages of old for the regulation of our conduct towards our neighbours, and this rule has been transmuted by the heavenly alchemy of one, who verily spake as never man has yet spoken, into the purest golden maxim of universal love. Now the very first, the most essential, requisites for the carrying out of this holy injunction are sincerity and honesty,—in one word, truthfulness.

If the student of the physical sciences is impressed with any one fact more than another, it is that there is no lie in Creation. Countless as are the objects he meets with in his survey of the universe around him, he receives the same answer from the same object whenever and wherever he interrogates it as to its relations with other objects. There is no whim, no caprice, no ambiguity. The behaviour of one substance with another is invariably the same to-day, yesterday and for ever, under the same circumstances. So firmly does this conviction become rooted in the mind of the student of physical science in the course of even a short study, that all apparent deviations are not only not looked upon as real deviations from nature's laws, but are believed to be due to the intervention of some fresh, unforeseen agency, and are therefore most narrowly watched and made the turning points of fresh discovery. Such a student, if he is not radically perverse, if he is not altogether devoid of a moral nature, cannot fail to see the moral bearing of this universal fact, cannot but feel and acknowledge the irresistible force of this preaching of truthfulness in one accordant voice by every object small and great in every region near and far of the universe of God, and cannot but shape his conduct accordingly towards his fellow creatures.

There is another fact, as universal as the one just mentioned, which indeed is its necessary outcome, but which science has revealed in its full significance only in these latter days. This is known as the Law of Conservation of Energy. There is nothing occult or mysterious in the expression. It simply means that nothing is lost. Not only is matter indestructible, but every particle, however minute, is so intimately linked with all the rest in the universe, that there cannot be a disturbance in it, however slight, but will be communicated to its immediate neighbour, and will thus travel from particle to particle, till it pervades the whole universe. The original disturbance may not be, and generally is not, communicated in its original form, but is transformed in a variety of ways, and thus becomes permanently registered not only at the place where the disturbance first occurred, but every where and for all time. What a deep, what a terrible significance has this fact for every rational and responsible being! Not a thought, not a feeling, not a sentiment can arise in the hidden recesses of the soul, not a sigh can escape the troubled heart, not a word can be uttered, not a deed can be done, but will be felt and recorded throughout the whole length and breadth and depth of the universe, in characters which cannot be effaced without annihilating the universe itself.

The words of Babbage in this connection will thus be seen to represent but sober measured truth: "If the Almighty," says he, "stamped on the brow of the earliest murderer, the indelible and visible mark of his guilt,—He has also established laws by which every succeeding criminal is not less irrevocably chained to the testimony of his crime; for every atom of his mortal frame, through whatever changes its severed particles may migrate, will still retain, adhering to it through every combination, some movement derived from that very muscular effort, by which the crime itself was perpetrated. The soul of the negro, whose fettered body surviving the living charnel-house of his infected prison was thrown into the sea to lighten the ship, that his christian master might escape the limited justice at length assigned by civilized man to crimes whose profit had long gilded their atrocity,—will need, at the last great day of human account, no living witness of his earthly agony. When man and all his race shall have disappeared from the face of our planet, ask every particle of air still floating over the unpeopled earth, and it will record the cruel mandate of the tyrant. Interrogate every wave which breaks unimpeded on ten thousand desolate shores, and it will give evidence of the last gurgle of the waters which closed over the head of his dying victim: confront the murderer with every corporeal atom of his immolated slave, and in its still quivering movements he will read the prophet's denunciation of the prophet king"—"THOU ART THE MAN!"

This law of conservation of energy is not an idle dream of the visionary, but a positive fact which modern research has discovered in every department of Nature. And it is my faith that this the latest teaching of the physical sciences, cannot but exert its chastening and subduing influence upon our whole moral being.

One of the gentlest hearts that ever breathed, an ardent admirer of nature and a lover of his species, has given expression, in inimitably beautiful but heart-rending language, to the anguish which every one however obdurate cannot but feel in his retirement from the bustle of the world, when reflecting upon the miseries which man has brought upon his fellow-men, under the idea that there will be an end of all human transaction with present existence and that time will bury in oblivion all that happens.

> To her fair works did Nature link
> The human soul that through me ran;
> *And much it grieved my heart to think*
> What man has made of man.

But when the conviction of the awful reality which modern science has proved to demonstration, that there cannot be an end of any human transaction with the end of this life, that there is no such thing as oblivion,—when such a conviction gains ground and has the ascendancy it ought to have and must have, then it is likely that the human world will cease to be the pandemonium which human wickedness and villainy have made it; and then, being in harmony with the world around, it will not only be glorious to look at, but glorious (and not, as Schopenhauer has very properly said it is, dreadful) in reality.

I have indicated just a few points touching the influence which a study of the physical sciences can legitimately exert on our moral conduct as regards our duty to ourselves, both in our single capacity as individuals and in our dual capacity as parents, and also as regards our duty to our neighbours, by which term we have always understood our fellowmen. But where are to be the lower animals? It has been the glorious prerogative of modern science to most effectively plead in their behalf, by elevating them to the rank of our progenitors. And we shall be devoid of all humanity if we did not treat them with the same gentleness and kindness and consideration with which we are bound to treat our fellowmen.

I have lastly to see if the study under consideration has any influence upon us as regards our supreme duty, our duty to the Creator. I must tell you that it is not without trembling, not without humbling myself to the dust, that I approach this subject. When I remember how some of the mightiest intellects have been wrecked in venturing to solve this awful mystery, I feel my littleness the most profoundly. But I feel the inherent right of exercising my own faculties, and with the light of positive facts which cannot deceive, I must draw my own inferences, and these I am happy to find are the same as those which have been the hope and the solace of humanity in all ages.

The spectacle of Nature, even in her superficial aspects as presented to the unaided senses, awakens in man feelings and sentiments and reflections which impel him to go behind the spectacle, to dive beneath the surface of the phenomena, in order to unravel the mystery and inquire into the cause of all this wonderful and magnificent panorama. This tendency to inquire into cause is inherent in the human mind, is an irresistible necessity of its very being. The will which we possess and by which we put forth our power to do what we wish to do, and the fact that the phenomena presented by Nature have all the impress of mind in them, foster and encourage this tendency. And accordingly we find that from the remotest ages of which we have record, man has not been satisfied with being merely an idle spectator of all that he sees, with being merely a part and parcel of the system in which he finds himself placed. Whence all this and whither does it tend? Whence and what am I, and what my own destiny?—are questions which occur to him with the dawn of his reason, and recur and haunt him at every step of his life. And the invariable result has been that the answer to these earnest questions which proceed from the depths of the soul, has never been satisfactorily furnished by the system itself, without the supposition of a superintending intelligence.

The adaptations of parts to each other for the subserviency of ends are so common and so obvious throughout the world which we inhabit in all departments, and in the heavens above, that even the observer, who has not the advantage of modern instruments which have in a most marvellous degree extended the range of the senses, even such an observer cannot fail to be struck by them. They have been the theme of admiration in all ages, and have inspired man with the most exalted sentiments of which he is capable, the sentiments of reverence and adoration to the Almighty Power, who is the author of all this wondrous world we see. To the sweet singer of Israel the heavens declared not only the glory but the righteousness of God. Jesus loved to draw the sublimest lessons of morality from the lilies of the field and the fowls of the air and little children. In the eyes of Shaikh Saadi, the most philosophic of Persia's bards, every leaf of every plant was a volume which proclaimed the wisdom of the Creator.

برگ درختان سبز در نظر هوشیار
هر ورقي دفتریست معرفت کردگار

Galen said, the best hymn man could chant in honour of the Creator was to write a work on anatomy.

Such was the influence which nature even in her superficial aspects exerted upon minds which could appreciate her beauties, such the inspiration with which she filled hearts which could feel the presence of her Lord in all her doings. Increased knowledge of nature has only unfolded her charms more and more. Science has not, as the poet would have it, "from creation's face enchantment's veil withdrawn." Every new discovery has added but fresh enchantment to what existed before.

Take the case of the heavens. Reflect for a moment upon the order which modern astronomy has introduced into that chaos of shining orbs and points which the darkness of night discloses to our view, how she has discovered the one universal law which controls their movements, how with the aid of the properties of light and the laws of chemical affinities discovered in our laboratories here, she has revealed the constitution not only of our own sun but even of those distant suns which from their very distance appear to us as twinkling points, thus uniting them all by the ties of family with our own earth;—reflect on all this, and then say, if the heavens declare less the glory and the righteousness of God now than they did in the days of the Psalmist.

Take the case of the leaf. Is it less striking as exhibitive of creative wisdom, now that the microscope has revealed its marvellous structure and physiology its marvellous *function* of building up monarch trees of the forest by absorbing the gaseous carbon of the atmosphere and fixing it in the solid form in the tissues of the parent plant? Indeed, the whole science of Botany has disclosed an inanimate kingdom of life, of which the smallest and the greatest units alike reveal wisdom which becomes more and more striking with closer and closer study. Take, again, the anatomy of man and the lower animals. It was of the most superficial description *in the days of Galen.* What wonders has the microscope brought to our gaze here in our time! Marvellous as the structures of plants are, they appear to be simple things compared with the structures of animals, and the marvel heightens with each step *in advance of the scale of life.* Each of the two kingdoms, vegetable and animal, presents a plan of progressive design from the lowest to the highest, in which that which most strikes the mind is the Unity that pervades their endless multiplicity and variety, proclaiming in the most definite and certain language, that there must be One Designer for both. Modern biology is not less beautiful and fervent a hymn than was crude anatomy in olden days.

We have seen that astronomy has united all the worlds in one bond of the most intimate family relationship, and we find a similar bond of union running through all living beings, animate and inanimate. The conclusion is irresistible that the whole universe, with *its infinity of worlds of matter and life and mind, forms* one stupendous whole, one boundless cosmos, which must own One Supreme Intelligence as its Author, Upholder and Governor. How can I describe what must be the influence of this grand conception of the universe as thus presented to us by the light of modern science? The mind totters at the contemplation, becomes utterly overpowered, and falls prostrate in humble adoration. I cannot conceive of any other attitude of mind and body in the Awful Presence. "The thunder rolls," says the bard of the Seasons—

> The thunder rolls: be hush'd the prostrate world;
> While cloud to cloud returns the solemn hymn!

It has been said by another bard that "the undevout astronomer is mad." Verily, can Science now tell all her votaries, verily the undevout student of nature is mad. For well has Carlyle through his Teufelsdröckh said: "The man who cannot wonder, who does not habitually wonder (and worship), were he President of innumerable Royal Societies, and carried the whole *Mécanique Celeste* and *Hegel's Philosophy*, and the epitome of all laboratories and observatories with their results, in his single head,—is but a pair of spectacles behind which there is no eye." And on this Dowden has very truly remarked: "What is this but an assertion, justified by the most careful analysis, that the highest truth of science and the highest truth of religion are one, and are both found in the confession of an inscrutable Power manifested to us through all external phenomena, and through our own intellect, affections, conscience, and will?"

The elevated conception of the Deity which, we have seen, springs up in the mind from a contemplation of the Universe as presented to us by Science, must be incompatible with all unworthy conceptions of Him. In other words, superstition in any shape and a knowledge of physical science cannot exist together. One of the most certain and inevitable consequences of a profound study of the physical sciences must be the impossibility of entertaining beliefs, and the dislodgment of already existing beliefs, whose foundations are undermined by physical facts. It must be obvious that all idolatrous and pantheistic beliefs must receive their death-blow from such study. I need hardly remind you of the supreme importance, and therefore of the imperative necessity, of such study from this point of view to my countrymen. Leaving out of account the very few who have risen to the worship of the True and Living God, one may say with strict truth that our country is still essentially idolatrous, that her teeming millions have not yet been able to rise from the worst and most revolting fetishism of primitive man, or if you will, "from nature's gods to the God of Nature," and that the priestly class, the most crafty, the most selfish and the most demoralized of any in the world, find it their interest to keep the masses in their low, degraded state. It is not right that this should be so. It is not right that any man, far less that so many millions of men for generations without number, should be kept down in false and unworthy beliefs and thus deprived of the elevating and regenerating influence of the first and highest Truth. If for no other reason, pre-eminently for this, is it the supreme duty of every devout student of nature to endeavour his best to introduce a knowledge of the physical sciences amongst the people of this country, so richly endowed and so capable of progressive improvement.

I am not unaware that some of the greatest minds,[*] students of physical science all, have become so bewildered in the very vastness of their study that they have found it impossible to rise from nature to nature's God. And it is most singular that the facts and laws, which rightly understood heighten our conception of the perfection of the Deity, have been turned into arguments against His very existence. The mode of evolution of the solar and inferentially of the whole stellar system, which Kant formulated and which goes by the name

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[*] "The two brothers Humboldt, it is well known, applying each a fine genius to different pursuits, diverged in their convictions with regard to the supreme objects of thought and faith. William, in sympathy with the life of humanity, studious of its expression in language, in literature, in law, and in all the vicissitudes of civilization, never lost the traces of a Divine Government over the world, and even in the superstitions of mankind saw only a barbarous jargon attempting an eternal truth. Alexander, at home in the great Kosmos, familiar with the ways of Nature from her rude Titanic workshops to her finest harmonies of life, significantly declared himself to be of "the religion of all men of science." That his implication of 'all men of science' in his own negative doctrine is far too sweeping,—not less so, indeed, than the Bishop of Oxford's counterpart assertion that 'no men great in science favor Mr. Darwin's hypothesis,'—is evident not only from the older examples of Newton, Boyle, Cuvier, and Davy, but from many of the newest representative names, Oersted, Herschel, Owen, Faraday. Still, there is ample evidence of a certain general tendency in Natural Science to foster habits of thought embarrassing to religious conviction. On a first view it certainly appears strange that the men most conversant with the Order of the visible universe should soonest suspect it empty of directing Mind; that they should lose their first faith on the very field where natural theology gleans its choicest instances of design, and on the other hand, that humanistic, moral, and historical studies—which first opens the terrible problems of suffering and guilt and contain all the reputed provocatives of denial and despair,—should confirm and enlarge, rather than disturb, the prepossessions of natural piety. The result, however, ceases to be paradoxical, on closer inspection of the relation between physical and moral knowledge."—

JAMES MARTINEAU.

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of the nebular hypothesis erroneously ascribed to Laplace; and the mode of evolution of living beings formulated by Darwin; both these hypotheses, which satisfactorily explain the facts and phenomena in their respective domains, and which appear to be substantially correct;—both these hypotheses are looked upon by a certain class of scientists as opposed to the legitimacy of the inference of a designer from design. The literature of science has been flooded with arguments for and against, and it is impossible to give even a bare summary of them at the present moment. I can only give you what my own convictions are on the subject. I believe in both hypotheses, and instead of shaking my faith in the existence of the Deity, they have served only to intensify that faith.

Darwin himself has admitted "the extreme difficulty or rather impossibility," I quote his own words, "of conceiving this immense and wonderful universe, including man with his capacity of looking far backwards and far into futurity, as the result of blind chance or necessity. When thus reflecting," continues he, "I feel compelled to look to a First Cause having an intelligent mind in some degree analogous to that of man.——But then arises the doubt," he immediately says, very honestly it is true, but betraying in my humble opinion the influence of the idols of the den spoken of above, "can the mind of man, which has, as I fully believe, been developed from a mind as low as that possessed by the lowest animals, be trusted when it draws such grand conclusions?" I take the liberty to answer this question by the question, why not? The train of reasoning, which must have led the author of the *Origin of Species* to the above argumentative question, was evidently this. The mind of the lowest animal is incapable of drawing conclusions. The mind of man has been developed from a mind as low as that. Therefore the mind of man can not be trusted when it draws such grand conclusions as those regarding the existence of the Deity. Darwin does not deny that the mind of man can draw conclusions at all, for what is "his capacity of looking far backward, and far into futurity," but his ability to draw inferences or conclusions regarding the past and the future from present data? To be consistent, the mind of man ought not to be trusted when it draws any conclusions whatever. It must be evident that this is a principle which is absolutely unworkable, for its effect would be, if attempted to be worked, to suspend judgment in every matter and paralyse all action. But fortunately no body does, as no body can, act upon this principle. Every moment of our lives we are trusting ourselves and others, in other words, the human mind, in drawing conclusions. And in judging of the accuracy of those conclusions, we do not trouble ourselves with theories as to how the mind originated. All that we have to do, all that we actually do, is to see if the conclusions have been legitimately drawn from sufficient data. Hence, however originated, if it is unquestionable that the mind of man can look far backwards into the past and far forwards into the future, that is, can draw conclusions regarding the past and the future which, however strange and marvellous, are found to wonderfully correspond with the realities of nature, why can it not draw other conclusions however grand and even startling which irresistibly flow from nature's facts? What better proof of the legitimacy of the inference of the existence of a Personal Creator can there be than that, by the very constitution of our being, we "feel *compelled* to look to a First Cause having an intelligent mind in some degree analogous to that of man?" Why then shrink from accepting this grand inference when it satisfies the very necessity of our being, and affords the only solution of the great mystery by which we are surrounded? The grandeur of the inference points to the elevated position man occupies with reference to other animated beings in this world, and ought to fill his heart with gratitude to that Being who has thus been revealed to him as the Creator of the universe.

Having pointed out the influence which a study of physical science is calculated to exert upon moral conduct, comprized in the fulfilment of our threefold duty, *duty to ourselves, duty to our neighbours,* and *duty to our Creator,* I might here stop. But the same study has opened out a vista, wider far both in point of space and of time than that bounded by man's earthly existence, and has thus compelled us to take a larger view of his destiny. Can physical science enlighten us as to that destiny? Has it any revelation to make about a mystery, to man of the greatest importance, the mystery of Death?—Death, which seems to be the sharp, impassable boundary-line between the light of his present existence and the absolute darkness beyond? Science has enabled man to descry the future of the physical world, to predict occurrences that are to come about in it long after he shall have ended his earthly career. Has he no future, or is his own future to remain concealed from his view? Is it forbidden to pry into this future? Forbidden it cannot be, as he has feelings and aspirations which irresistibly lead him to yearn after a life beyond the present, which cannot be satisfied by anything short of endless existence, which tell him that if his personal existence were to close with this life, God and the universe would be to him as if they were not, and that it would have been better far, infinitely better, if he had not been called into being at all. The question, therefore, "what fate awaits us when we die?" is the question of questions which man asks himself and all his surroundings with an anxiety which can only be relieved by one answer. Is that the answer he receives from physical science?

The very fact of man being able to look back into the past and forward into the future, inspires the hope that this his present life is not likely to be the be-all and the end-all of his existence. And when it is remembered that this wonderful capacity has grown and is daily growing with the growth of the physical sciences, it will be evident how a study of these sciences is calculated to strengthen that hope. Here again, strange to say, scientists are not wanting, and they belong chiefly to the class of workers who deal with life and its phenomena, who look upon a future life as an impossibility. At first sight this seems to be the inevitable conclusion from the facts of nature. Death is the invariable termination of all life on earth, and no trace of any living being as such has yet been found after the dissolution of the body. Nor has any rational being ever returned to the scene of his former existence after the cessation of that existence, to tell the tale of the existence he or she may be leading, and thus furnish the most direct proof of a future life. There are stories, as we all know, of the occasional reappearance of the dead to relations, friends, acquaintances, or others, but where these stories are not positive fabrications, the phenomena they relate have so often been proved to be mere illusions of the fancy, that we may well reject them as having no legitimate bearing on the present argument. We must give up all hope of direct proof, and look about for any indirect ones that may be found, calculated to lend probability to the belief in a future existence.

The science, which is capable of throwing any light on the subject, is biology. In this world there is no manifestation of mind except through a material organization; and the connection between the mind and that organization, or, more properly speaking, that part of it called the nervous system, is so intimate, the manifestations of the former are so closely dependent upon the integrity of the latter, and besides the development of the former is in such correspondence with the development of the latter, that the belief seems to be natural that the one, if not identical with the other, is somehow evolved from it. The question would be settled if living beings could be formed *de novo*, independent of pre-existent living beings. But in the absence of such demonstrative experiments, have we not, daily and hourly before our eyes, other and almost similar experiments performed for us by nature, and to a large extent modifiable by ourselves, which nearly demonstrate the point in question? We see the genesis of living beings, and we avail ourselves of the laws governing it, to modify at our will the character, physical and even mental, of beings that we want to call into existence. If, even under these circumstances, we refuse to look upon the mind as having its genesis in the organism, we can only account for its existence there under the shadow of hypotheses beset with infinitely greater difficulties in the way of their acceptance.

One of these hypotheses is, that at some period of intra-uterine life, the mind or the soul is by the Creator breathed or somehow introduced into the forming organism, intended to be its temporary dwelling-house, or the soul having been once introduced into the first man, has part of its essence continued into successive generations by the sperm-cell and the germ-cell. The greatest stumbling block in the way of acceptance of this hypothesis is offered by the Darwinian hypothesis which has very nearly taken rank as a well-established theory. The other hypothesis is that of transmigration of souls, under which we have to assume that spirits are floating about everywhere, seeking for suitable organisms for their temporary habitations either from choice, or doomed to them by an unalterable fate, or by an irrevocable curse of some greater being. Such an hypothesis would introduce the greatest confusion into the affairs of life, because it would do away altogether with the law of causation, and shut up all scientific prevision.

So far, therefore, as we can arrive at any conclusion from available data, we have no other alternative than to believe as in the highest degree probable that the mind has its genesis in the material organization, through and by which it manifests itself. But because so, it does not necessarily follow that it must cease to exist with the dissolution of that organisation. In my humble opinion it is only a superficial reading of the facts of biology which seems to lend countenance to the fear that with death ends all conscious and personal existence. We know that though the child is dependent upon the mother for its development and growth up to a certain point of its existence, it becomes independent of her after that; and we do not see any reason why the same may not be the case with the mind or the subtler essence which thinks and feels, which is the true man, the inner man as it has been happily called, with reference to the grosser body, whose function it is to rear up the spirit enclosed within it.*

In this view, death ceases to be the great bugbear it has always been, striking terror into the stoutest hearts. Rightly understood it is no more than severance of the umbilical cord of present relationships which binds man to mother earth. The cultivation of the physical sciences conclusively shows that there is no limit to man's progress in knowledge, and necessarily no limit to the development of his whole being, except what is imposed by the conditions of his existence on our planet. His knowledge would increase with the increase of his years, but then his race would multiply so fast that the earth would be insufficient to accommodate them. And moreover a time will come when the resources and capabilities of the earth itself will become so exhausted that it shall fail to supply him with fresh data for the enlargement of the sphere of his knowledge. In other words, physical science has made it plain that this earth cannot be his eternal abode. Death should, therefore, be hailed as the blessed event which frees him from the trammels of his existence in this world, in which, all things remaining the same, his individual progress must necessarily come to be more and more limited till it will cease altogether; and ushers him into a higher existence in which, his experience gathered in this life tells him, that under new and improved conditions he may enter on a career of never-ending progress.

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* This view, it cannot be denied, has the appearance of what is ordinarily looked upon as materialism. But it has the appearance only, for we know nothing of the ultimate nature of matter, nor of mind. It is true, as has been stated by Prof. Tyndall, that "the passage from the physics of the brain to the corresponding facts of consciousness is unthinkable;" and that "granted that a definite thought and that a definite molecular action in the brain occur simultaneously, we do not possess the intellectual organ, nor apparently any rudiment of the organ, which would enable us to pass, by a process of reasoning, from one to the other." But it is equally true that the association between matter and mind is intimate, and that not only is the manifestation of the latter through a material machinery, but that its very birth and development and growth seem to be coincident with the birth and development and growth of the latter. Here are two difficulties which we cannot, in the present state of our knowledge, reconcile with each other, though we are convinced that there must be a reconciliation between them.

A future life, in other words, the continuity of the life begun here, removes all the anomaly that would otherwise mar the harmony of the universe. "The denial of a future life," as has been very truly said by Alger, "introduces discord, grief, and despair in every direction, and, by making each step of advanced culture the ascent to a wider survey of tantalizing glory and experienced sorrow, as well as the preparation for a greater fall and a sadder loss, turns faithful affection and heroic thought into 'blind furies slinging flame.' Unless immortality be true," continues he, " man appears a dark riddle, not made for that of which he is made capable and desirous : everything is begun, nothing ended ;* the facts of the present scene are unintelligible ; the plainest analogies are violated ; the delicately-rising scale of existence is broken off abrupt ; our best reasonings concerning the character and designs of God, also concerning the implications of our own being and experience, are futile ; and the soul's proud faculties tell glorious lies as thick as stars."

Indeed, it is only a future life which can account for and satisfy the irresistible and inextinguishable instincts implanted in man,—his longing for life, his love of off-spring,† his sense of justice, his progressive capability of encompassing time, past present and future. It is only the assumption of a future life which enables us to take a correct, a just, because a comprehensive, view of Creation. And thus the belief in a future life helps in clearing up the mystery of the existence of Evil,—a mystery which has been a puzzle to all thinking men in all ages, which has led the unthinking to entertain doubts about the absolute goodness of the Creator, and which has furnished the sceptic with excuses for denying his very existence. With a never-ending life before him man sees a beneficent meaning in the universe, is assured that he has a destiny which it is in his power to make either happy and glorious or miserable and ignoble, and that towards the fulfilment of that destiny the whole universe is ready to act in concert with him, if he will but wish it.

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* Cuvier said on his death-bed : "I had great things still to do. All was ready in my head." What man of science, what man of action in any line of life, is there, of whom this might not be said? What man, not absolutely thoughtless, is there who will not feel, when about to take his departure from this world, that he had many great and good things still to do? No man, unless an idiot, can say at the time of death that he has *done all that could be done, that is, has left nothing undone.*

† Unless the universe is a delusion parental love serves as the unerring index of the love which the Creator has for his creatures. If co-existent with the other instincts which lead to progressive development and thus point to futurity, parental love would afford one of the strongest proofs of immortality. Whether this view postulates immortality to the brutes, is more than can be determined with any degree of positivity from data at present available. The evolution of this affective principle, progressing with the rise in the scale of beings, and attaining its culmination of rational development in man alone, is a significant fact, which should not be lost sight of in this inquiry.

The words of an able reviewer of the Positive Philosophy of M. Cômte—a philosophy which has gone far beyond agnosticism, and audaciously taken up the position of an emphatic protest against all belief in a creative intelligence as opposed to all progress,—these words of the reviewer appear to me so applicable and appropriate to our present argument, and presents such a masterly refutation in a condensed form of atheistic sophisms, that I cannot resist the temptation of quoting them :

"Had the opinions," says he, "we have been combating been maintained by those rash speculators, who are permitted at distant intervals to disturb the tranquility of the religious world, we should not have allowed them to interfere with ours. But when a work of profound science, marked with great acuteness of reasoning, and conspicuous for the highest attributes of intellectual power—when such a work records the dread sentiment, that the universe displays no proofs of an all directing mind, and records it too as the deduction of unbiased reason, the appalling note falls upon the ear as like the sounds of desolation and death. The life-blood of the affections stands frozen in its *strongest and most genial current*, and reason and feeling but resume their ascendancy, when they have pictured the consequences of so frightful a delusion. If man is thus an orphan at his birth, and an outcast in his destiny; if knowledge is to be his punishment and not his pride; if all his intellectual achievements are to perish with him in the dust: if the brief tenure of his being is to be renounced amid the wreck of vain desires, of blighted hopes, and of bleeding affections—then in *reality*, as well as in metaphor, is *life* a dream."

Thus, briefly and necessarily very imperfectly, I have endeavoured to put before you the most obvious points of the influence which a knowledge of physical science exerts upon our moral nature in its varied relationships; in other words, I have endeavoured to show how our minds are affected by a systematic study of the physical universe, the universe which is cognizable by our senses. Such systematic study, which constitutes the very essence of physical science, ought to be distinguished from the passive, random observation which was all the basis of the speculations of ancient sages. And it is no wonder that these speculations should so often have diverged so widely *from the truth, being either absolutely*

> ———"false, or little else but dreams,
> Conjectures, fancies, built on nothing firm."

For, mere contemplation, unguided by severe systematic study, will only cause man to project himself into the outer world, and people it with his own vain and idle imaginings in place of living realities. It is only by a systematic study, as we have seen, that he finds the universe a cosmos, a well-ordered harmonious whole, with the impress of a directing intelligence throughout; and not a chaos holding eternal anarchy, and chance governing all. The contemplation of the universe under the guidance of such study, therefore, brings the human mind in contact with a Mind which is like itself but infinitely transcending it in all its attributes. And thus the mind of man is revealed to him by the light of physical science as formed in the image of the Divine Mind.

The study of the physical universe, therefore, is, in point of fact, the study of the Divine Mind in certain of its manifestations. These manifestations serve a purpose, the purpose of educating a certain order of rational creatures of which man forms perhaps the lowest type. Whether there are beings, Pure Intelligences, who are independent of the physical universe for their origin and development and growth, we cannot tell. But that creatures like man are so dependent, there is ample evidence to prove. For such creatures, the study of the physical universe must be essential. The fact of physical laws being verifiable, the fact of physical phenomena being reproducible by a due arrangement of their causal conditions, or at least predictable by calculation, affords the unchangeable basis on which the human mind can take its stand for positive certainty in all its investigations. Thus physical science strengthens the faith that is in us in the uniformity of nature, which, being rightly interpreted, means the faithfulness of the Creator to his creatures, by furnishing it with the evidence of things not seen, and thus physical science teaches that that faith has been implanted in us to give us assurance of the realization of things hoped for.

On the conclusion of the lecture, His Honour the President made the following remarks* :—

" I am sure that I am expressing the feelings of the whole assembly in offering to Dr. Mahendra Lal Sircar our thanks for his interesting, instructive and eloquent address. My Hon'ble colleague occupies a very leading position in the scientific world which entitles him to speak with authority, and I trust none of the young men here present will forget the weighty advice he has given as to the influence which science ought to have in all departments of our moral life. He first dealt with it as regards our duties to ourselves—to our own bodies and to the bodies of the other sex with whom we associate; and I think it is noticeable that where political reformers have been afraid to give advice, the true scientific man does not hesitate to speak out boldly as to the importance of the reform in the minimum age of cohabitation, which is one of the burning questions of the day. I trust also that I am not wrong in assuming from the applause with which you received his remarks that you agree to his views and will endeavour each of you in his own circle to carry them out.

The second part of the discourse related to our duty to each other and enforced the important doctrine of the conservation of forces, shewing how nothing that has once existed ever wholly perishes, and how all our acts influence our neighbours and our surroundings and create an echo which rolls on through the future and produce effects which often we could neither foresee nor desire.

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* Taken from the *Reis and Rayyet*, of the 10th January, 1891, which is the only Paper which has given a faithful reproduction of these valuable remarks.

The third and most eloquent and perhaps the most important part of the address related to our duty to God: and here it was a great satisfaction to me to listen to the lecturer taking so firm a stand on the doctrine that all scientific discovery and investigation point more and more clearly to the existence of a great First Cause. He reminded me of those noble lines of Browning's:

> How admiration grows as knowledge grows!
> How imperfection means perfection hid!

It is often said that the effect of the introduction of Western science to the Eastern mind is to shatter all existing beliefs and to leave behind only a bitter athesim or a sad agnosticism—but here we have a leading scientific man in Calcutta declaring to us that science leads to a firm belief in the Deity and a devout attitude of mind before the great First Cause.

For the whole of his lecture and above all for this last portion of it, I beg to return the thanks of this meeting to Dr. Mahendra Lal Sircar."